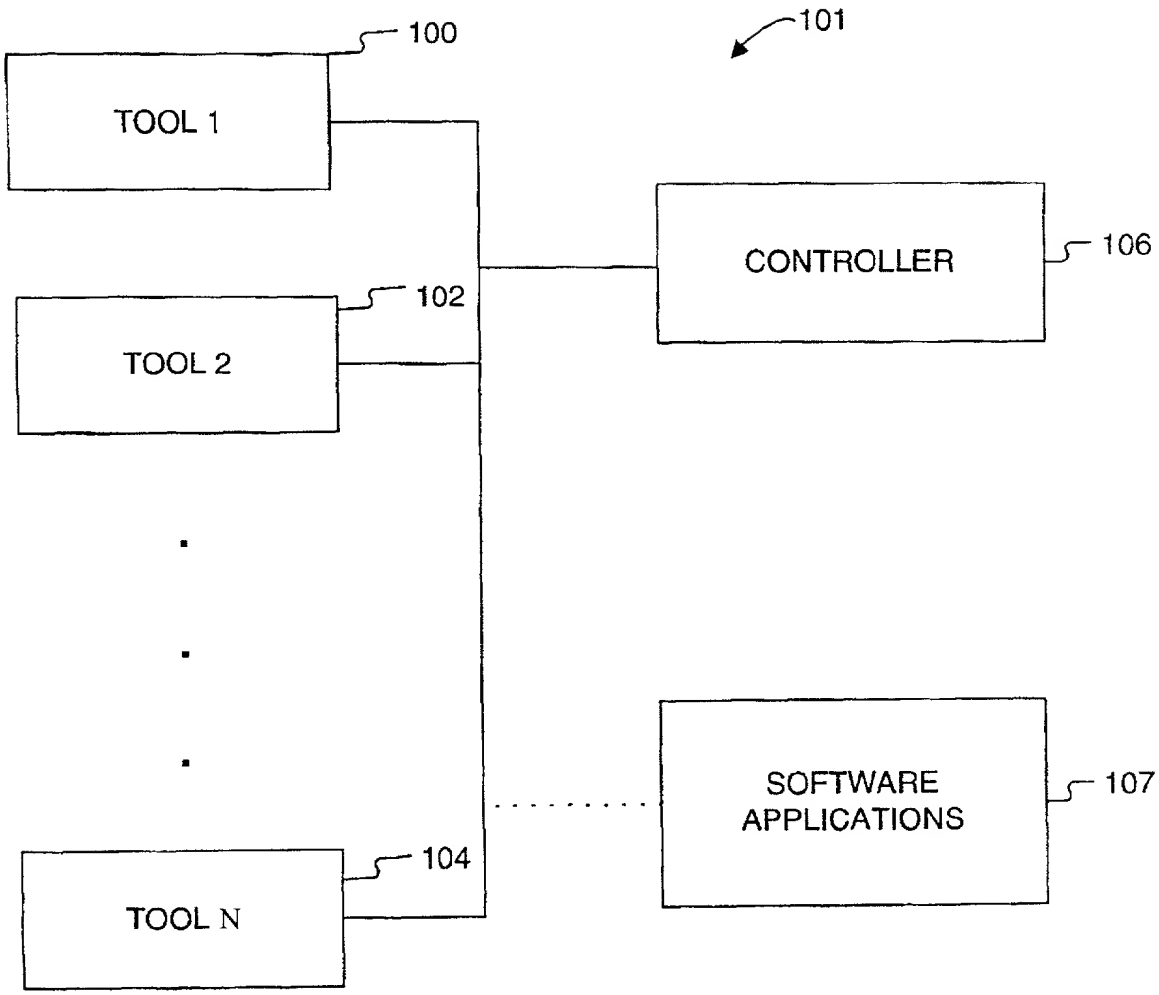

(Prior Art)

FIG. 1

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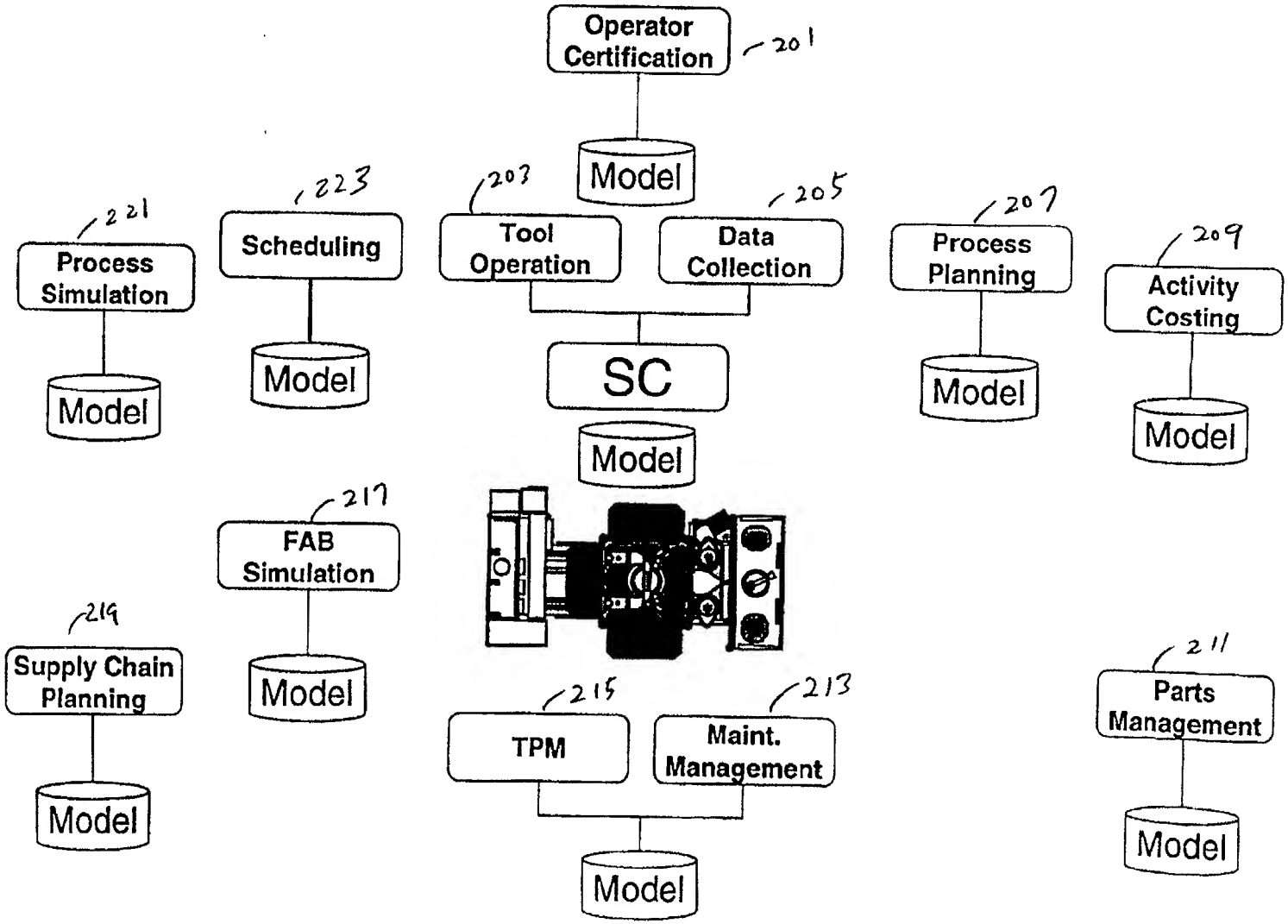
CONTROLLER/SOFTWARE APPLICATIONS

(PRIOR ART)

FIG. 2



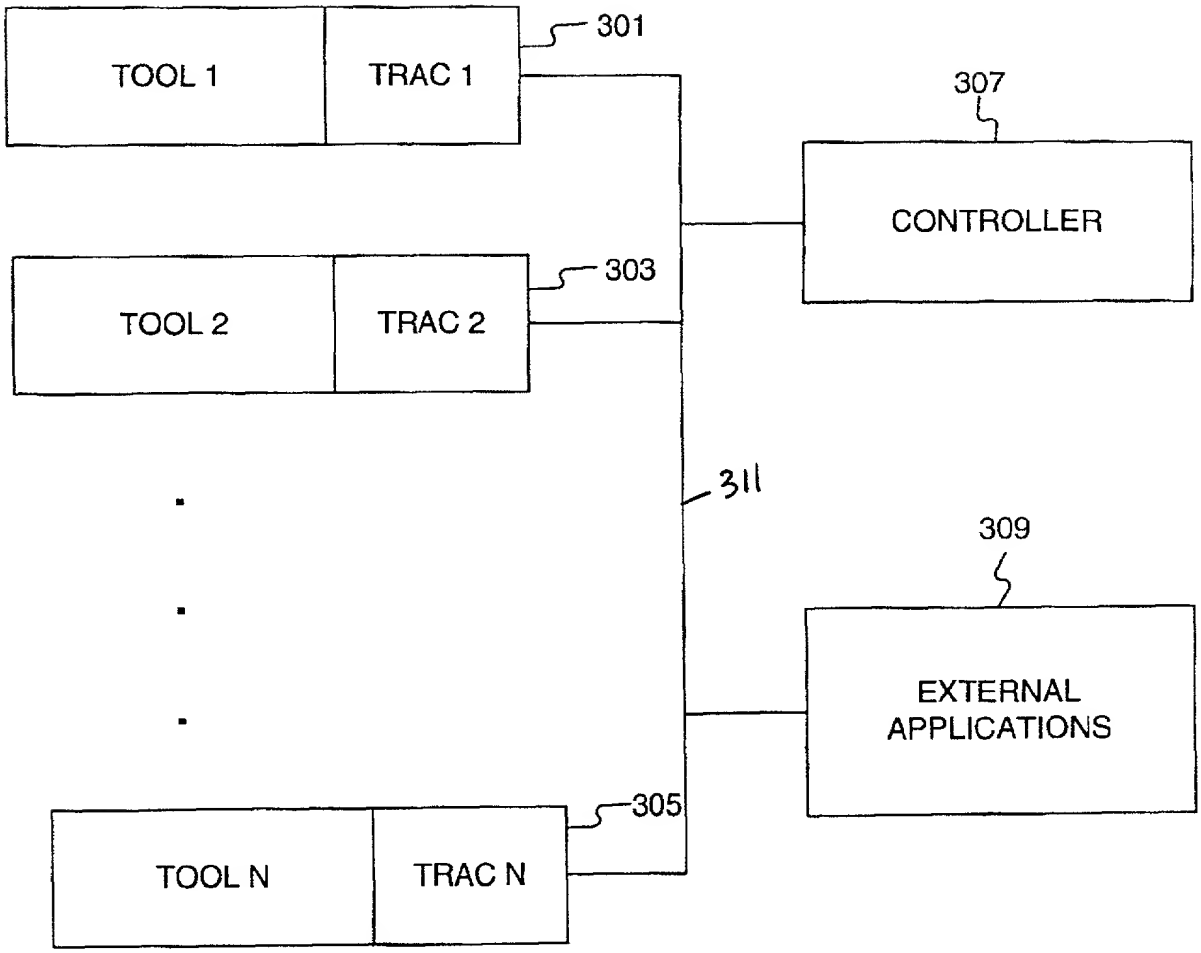

TOOL 1
TRAC 1
301
307
CONTROLLER
TOOL 2
TRAC 2
303
311
309
EXTERNAL APPLICATIONS
TOOL N
TRAC N
305

FIG. 3

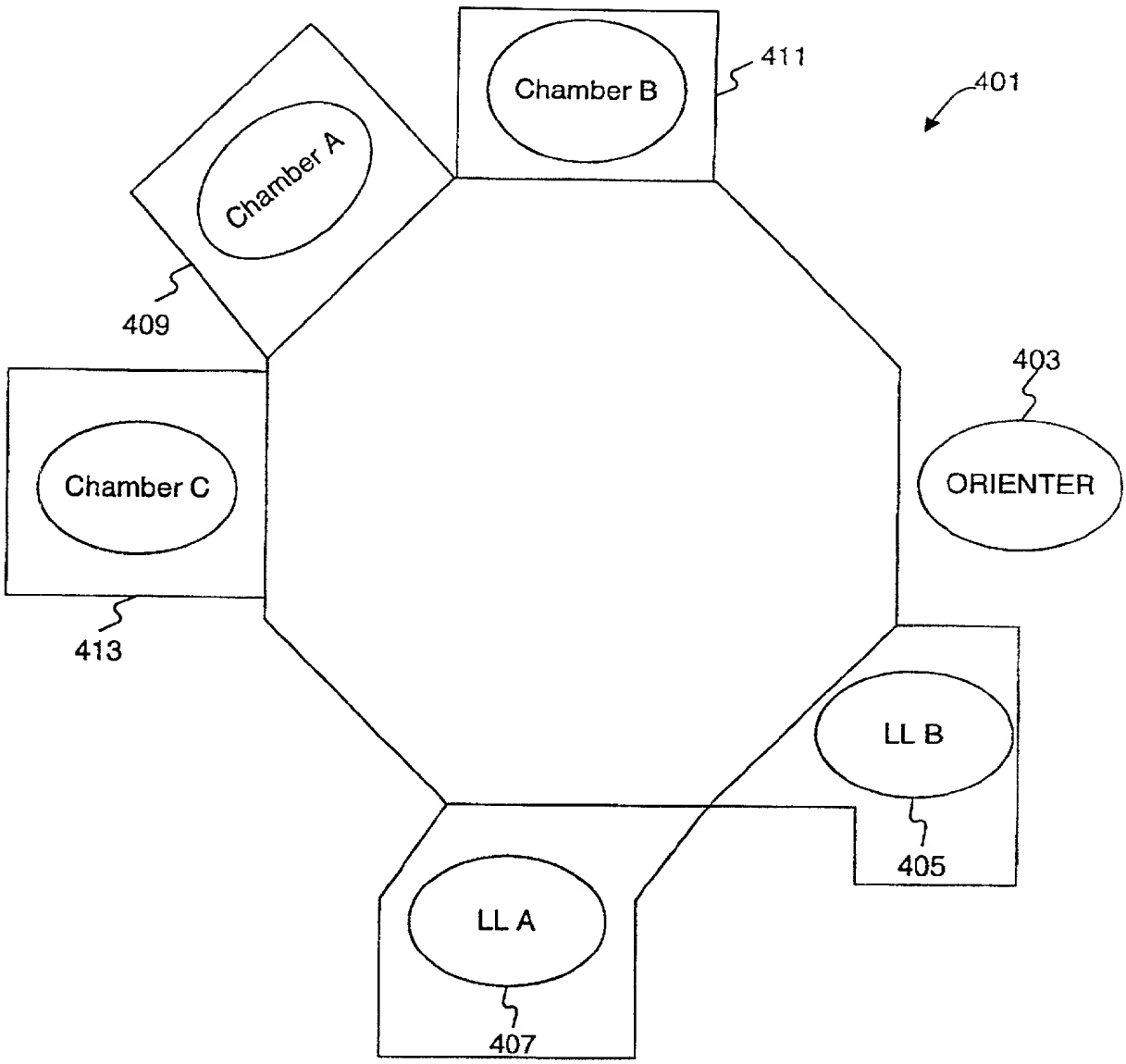

Chamber A
Chamber B
411
401
409
403
Chamber C
ORIENTER
413
LL B
405
LL A
407

FIG. 4

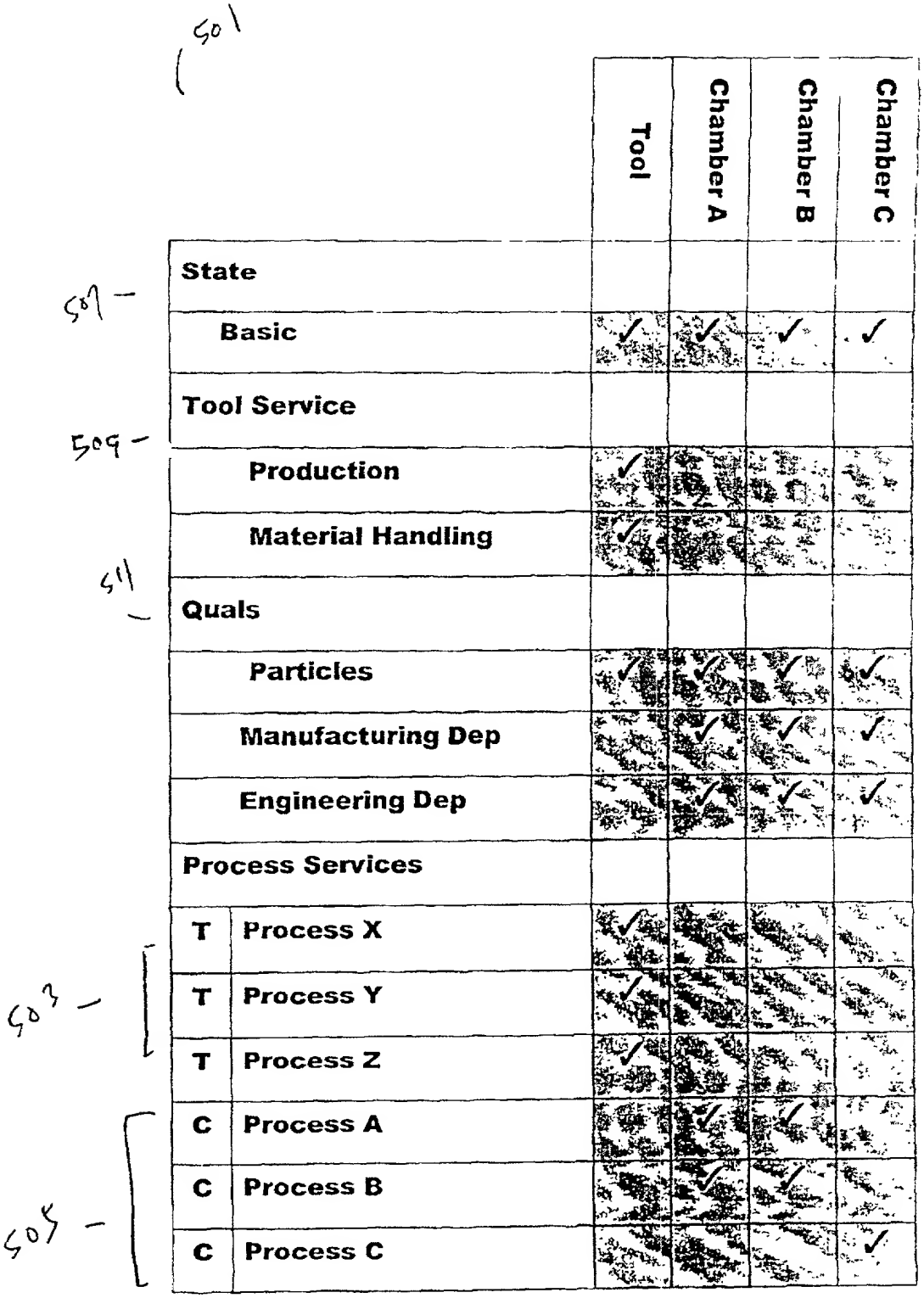

501
507
509
511
503
505
Tool
Chamber A
Chamber B
Chamber C
State
Basic
Tool Service
Production
Material Handling
Quals
Particles
Manufacturing Dep
Engineering Dep
Process Services
T Process X
T Process Y
T Process Z
C Process A
C Process B
C Process C

FIG. 5

FIG. 6

601

QoS - Cpk		Tool	Chamber A	Chamber B	Chamber C
Process Services					
	Process X				
	Process Y				
	Process Z				
	Process A		2.1	2.16	
	Process B		3.03	3.21	
	Process C				4.16

FIG. 7

701

QoS - Proc. Time		Tool	Chamber A	Chamber B	Chamber C
Process Services					
	Process X				
	Process Y				
	Process Z				
	Process A		42	43	
	Process B		36	41	
	Process C				130

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801

QoS - CPK		Tool 1	Tool 2	Tool 3	Tool 4
Process Services					
	Process X	2.35	2.1	2.16	X
	Process Y	3.41	3.03	3.21	X
	Process Z	X	4.19	4.21	4.16

FIG. 8

09927444 - 061501

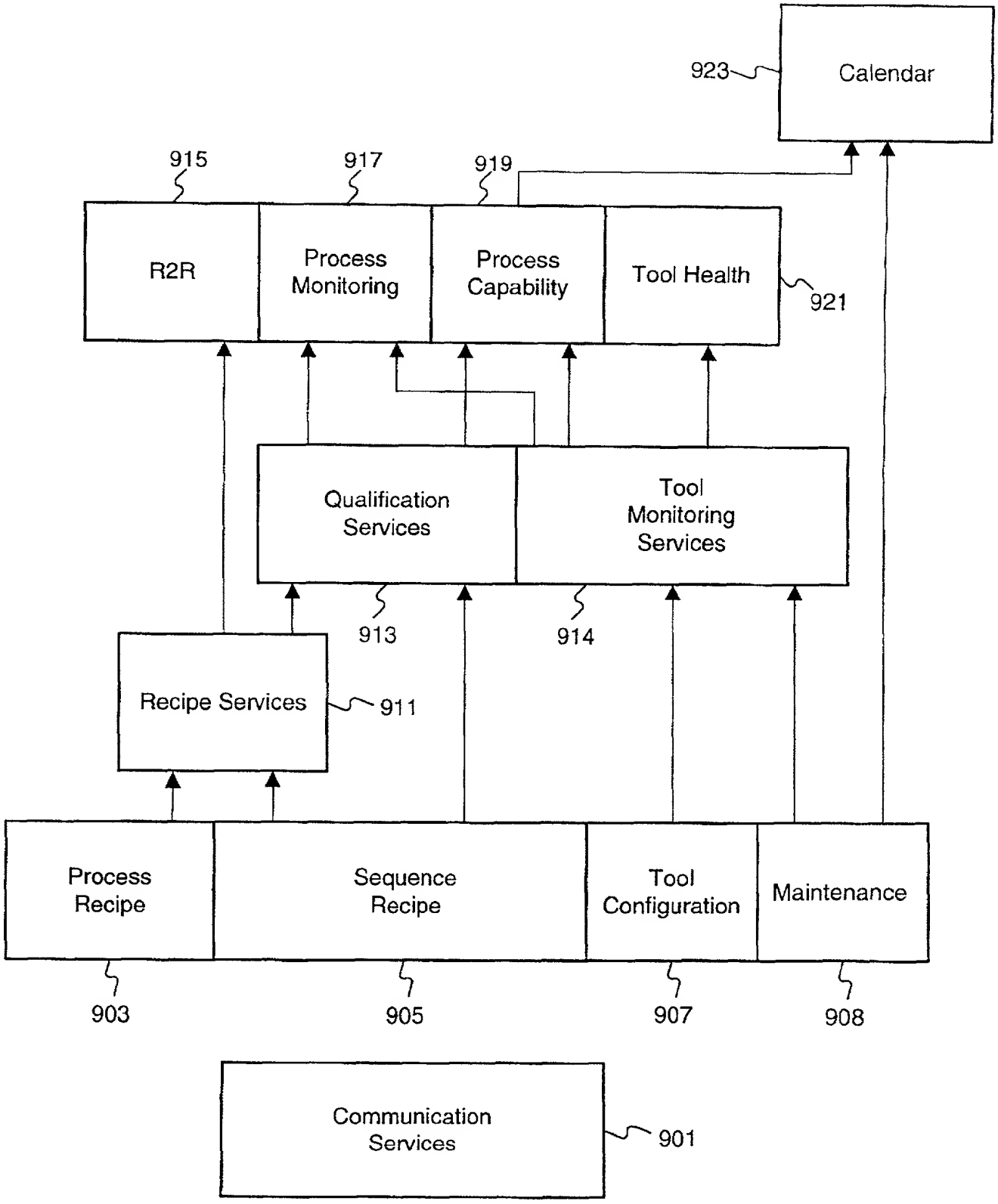
923
Calendar
915
917
919
R2R
Process Monitoring
Process Capability
Tool Health
921
Qualification Services
Tool Monitoring Services
913
914
Recipe Services
911
Process Recipe
Sequence Recipe
Tool Configuration
Maintenance
903
905
907
908
Communication Services
901

FIG. 9

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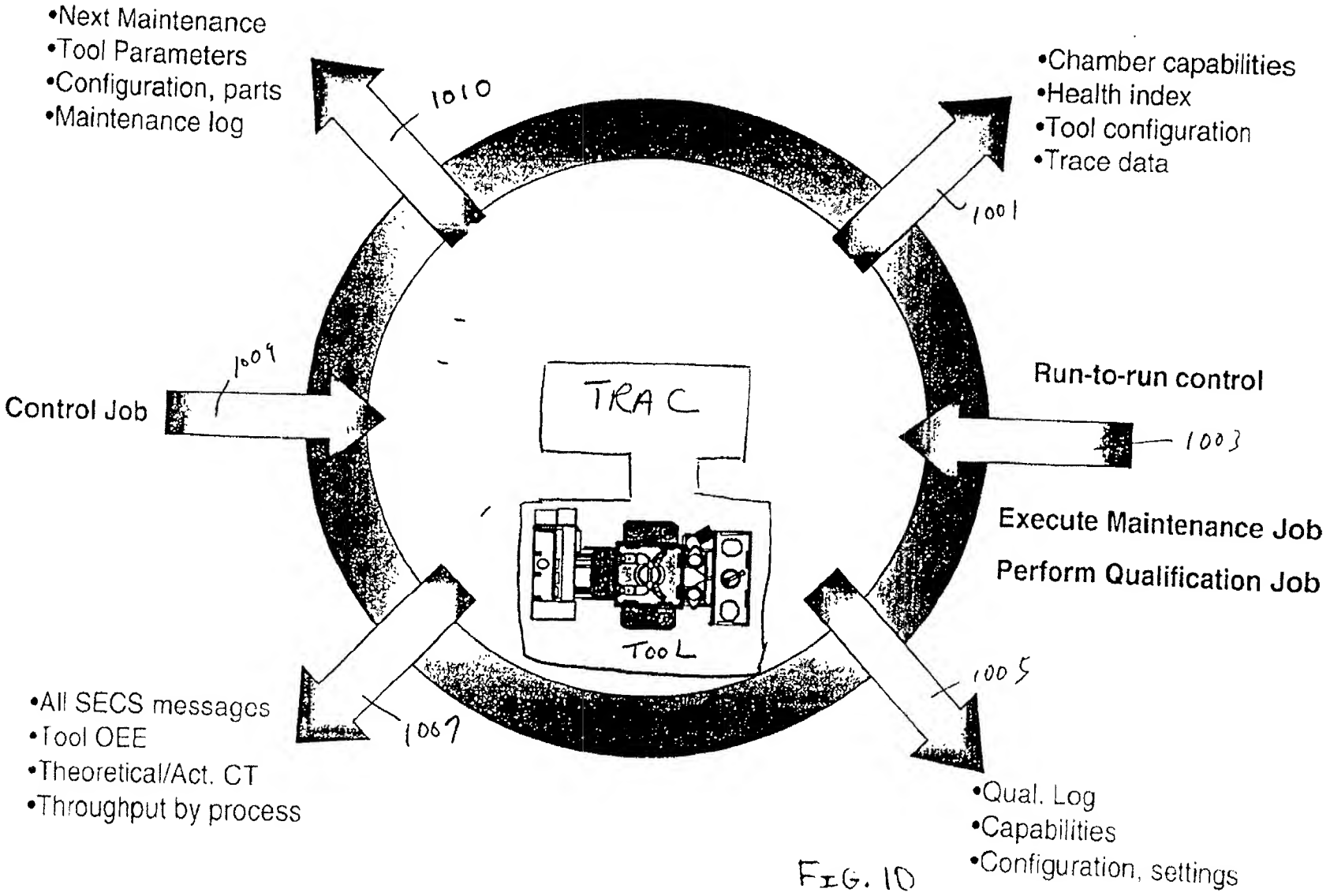

FIG. 10

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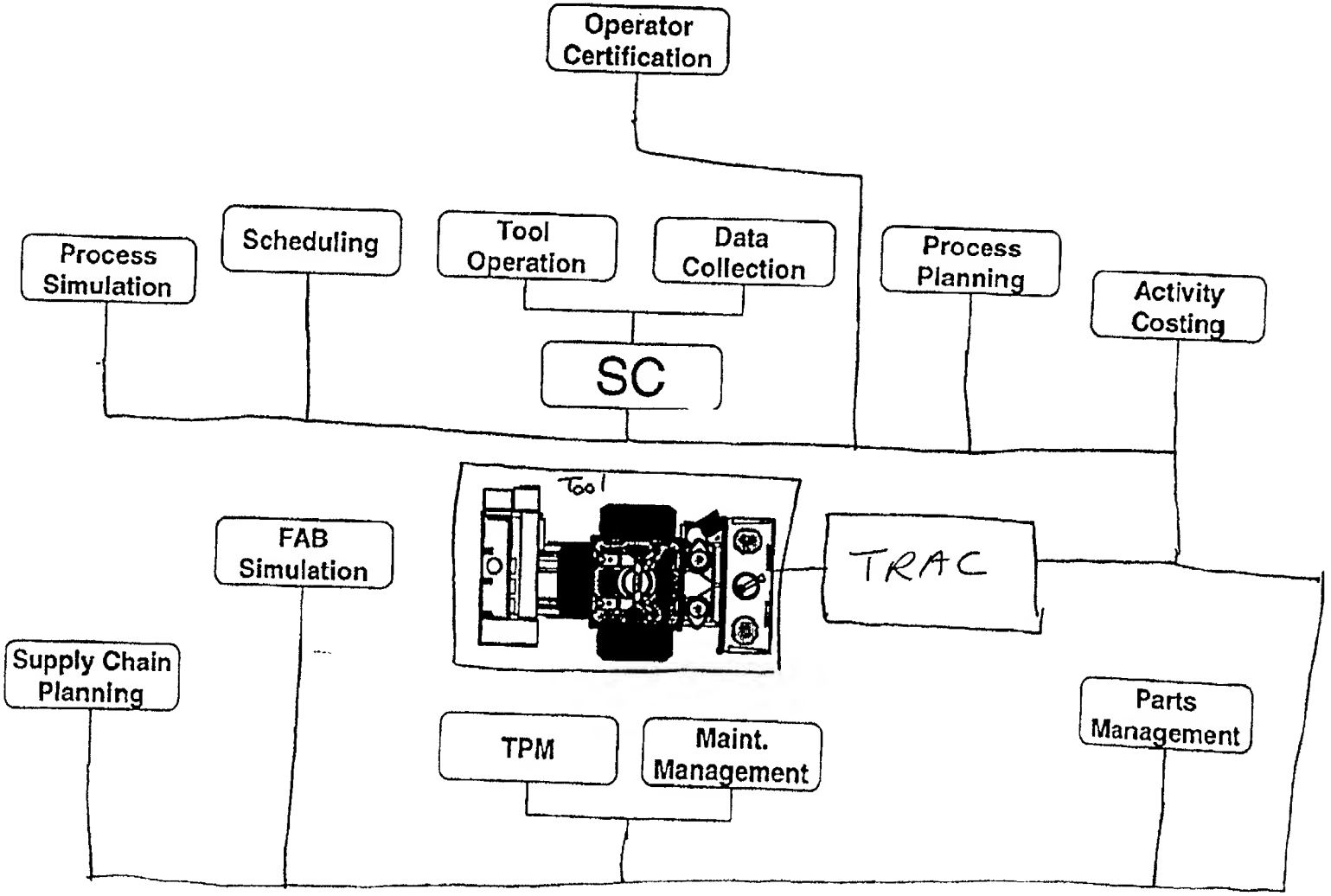
Fig 11

CONTROLLER/SOFTWARE APPLICATIONS



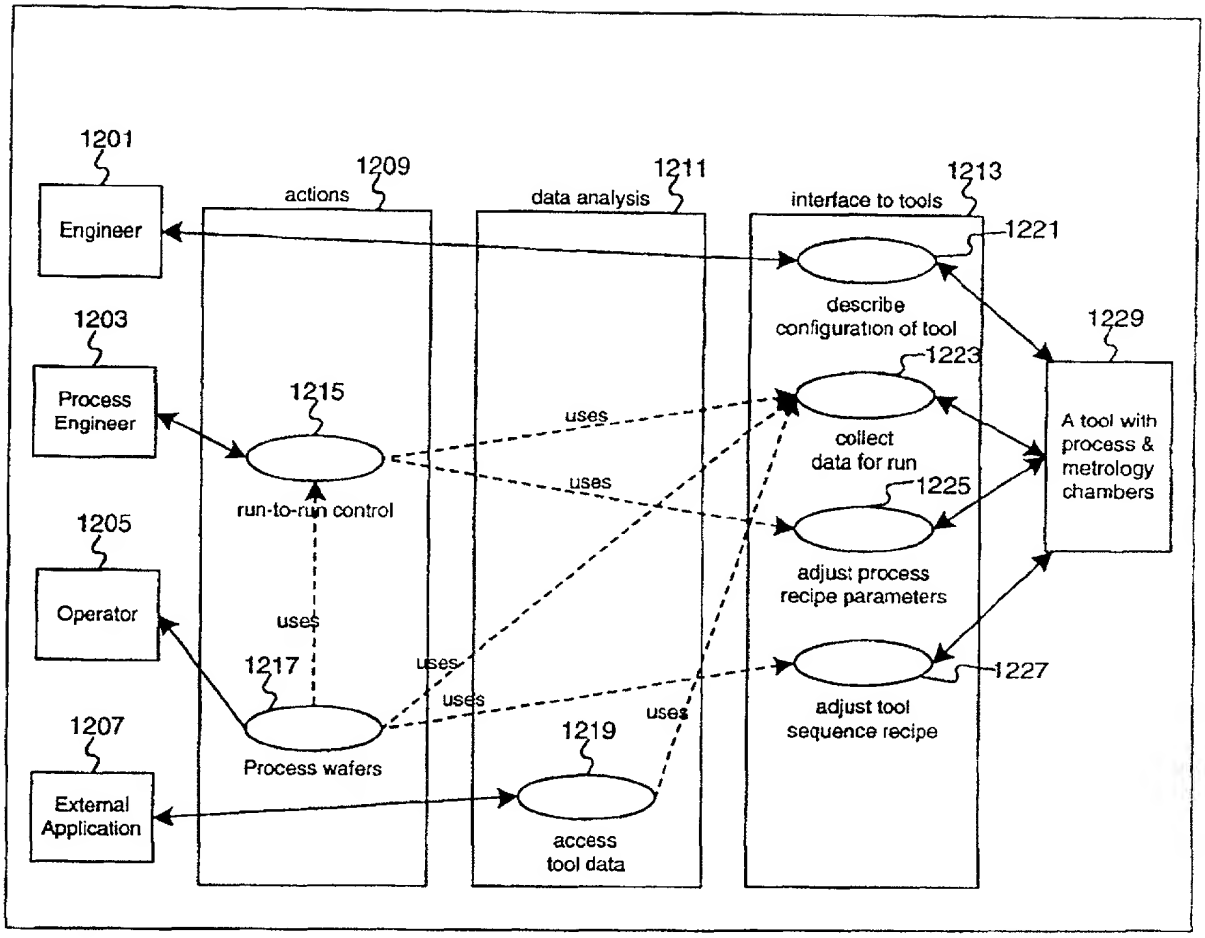

1201
Engineer
1203
Process Engineer
1205
Operator
1207
External Application
1209
actions
1211
data analysis
1213
interface to tools
1215
run-to-run control
1217
Process wafers
1219
access tool data
1221
describe configuration of tool
1223
collect data for run
1225
adjust process recipe parameters
1227
adjust tool sequence recipe
1229
A tool with process & metrology chambers
uses
uses
uses
uses
uses
uses

FIG. 12

0090744 "0634301

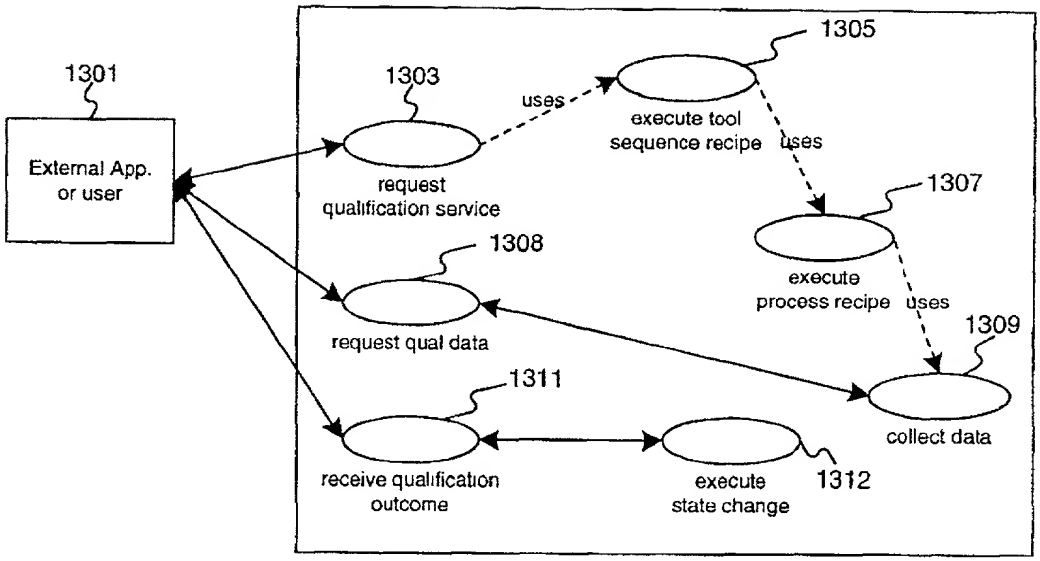


FIG. 13

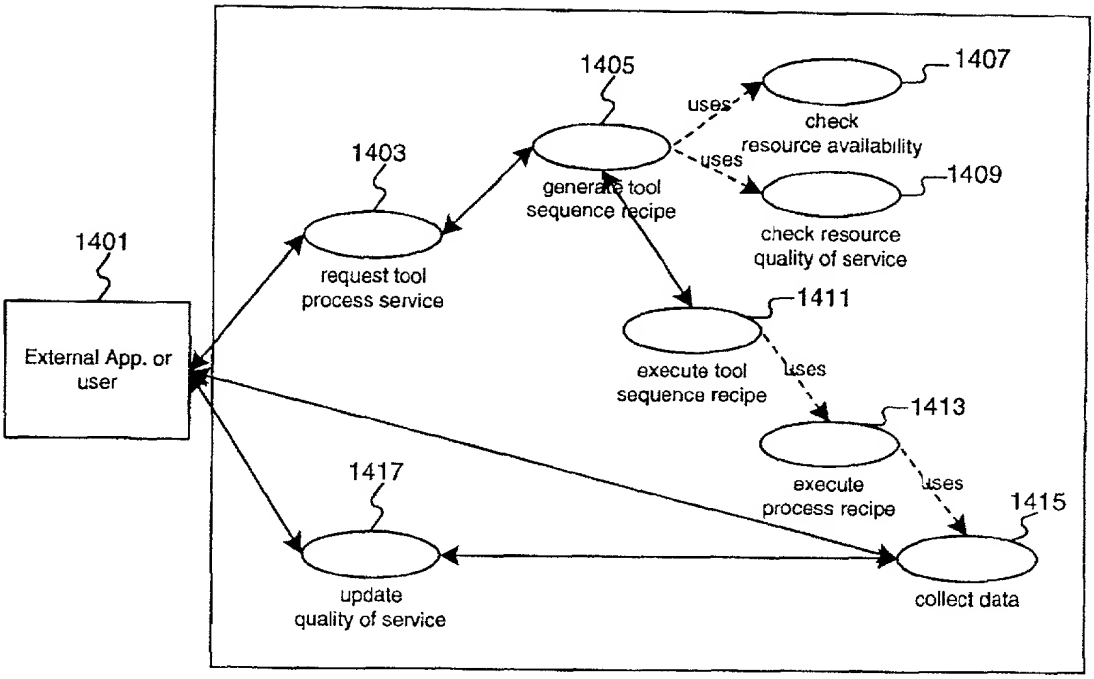

1401
External App. or user
1403
request tool process service
1405
generate tool sequence recipe
uses
1407
check resource availability
uses
1409
check resource quality of service
1411
execute tool sequence recipe
uses
1413
execute process recipe
uses
1415
collect data
1417
update quality of service

FIG. 14

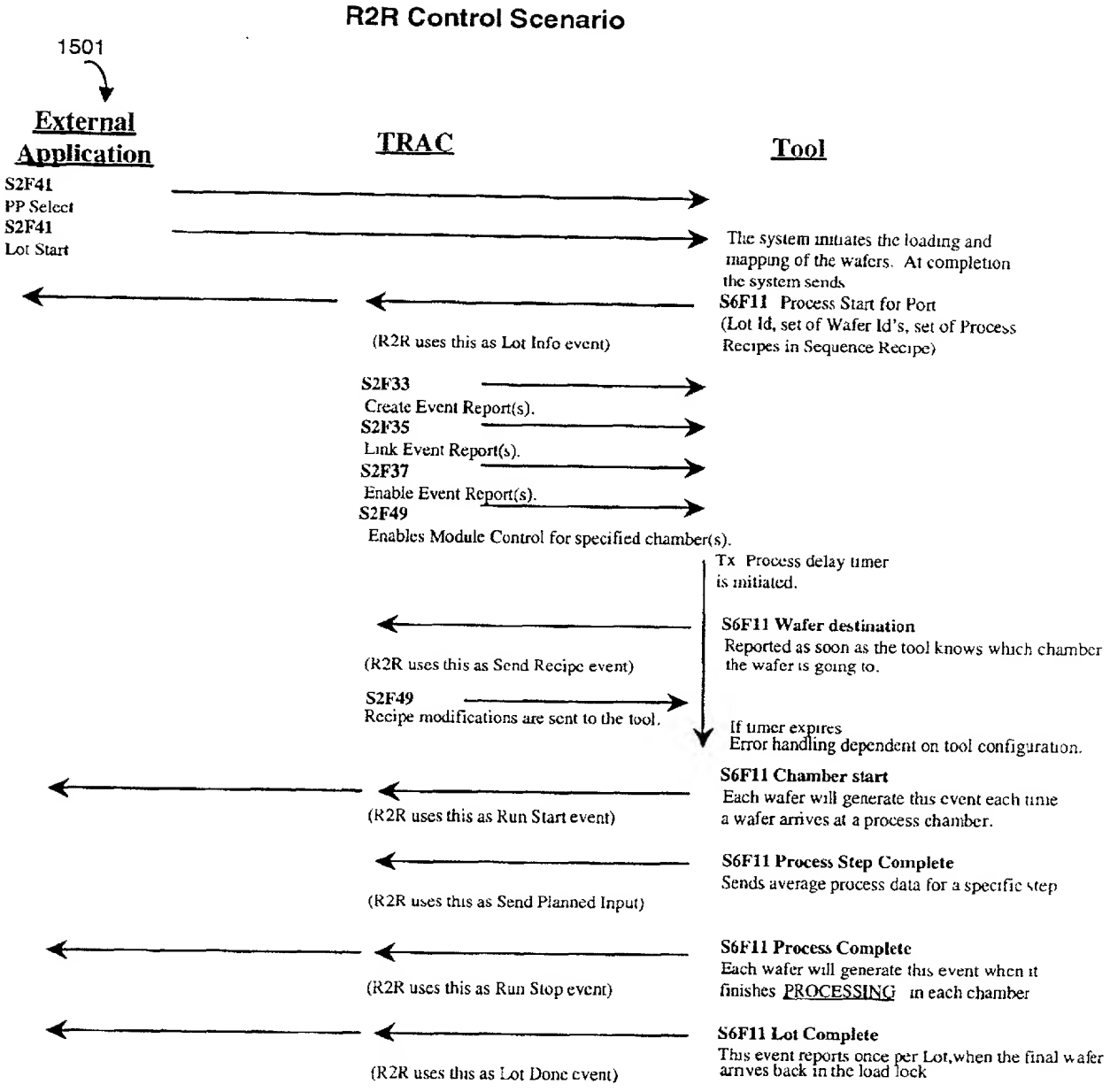

R2R Control Scenario
1501
External Application
TRAC
Tool
S2F41
PP Select
S2F41
Lot Start
The system initiates the loading and mapping of the wafers. At completion the system sends
S6F11 Process Start for Port
(Lot Id, set of Wafer Id's, set of Process Recipes in Sequence Recipe)
(R2R uses this as Lot Info event)
S2F33
Create Event Report(s).
S2F35
Link Event Report(s).
S2F37
Enable Event Report(s).
S2F49
Enables Module Control for specified chamber(s).
Tx Process delay timer is initiated.
S6F11 Wafer destination
Reported as soon as the tool knows which chamber the wafer is going to.
(R2R uses this as Send Recipe event)
S2F49
Recipe modifications are sent to the tool.
If timer expires
Error handling dependent on tool configuration.
S6F11 Chamber start
Each wafer will generate this event each time a wafer arrives at a process chamber.
(R2R uses this as Run Start event)
S6F11 Process Step Complete
Sends average process data for a specific step
(R2R uses this as Send Planned Input)
S6F11 Process Complete
Each wafer will generate this event when it finishes PROCESSING in each chamber
(R2R uses this as Run Stop event)
S6F11 Lot Complete
This event reports once per Lot,when the final wafer arrives back in the load lock
(R2R uses this as Lot Done event)

FIG. 15

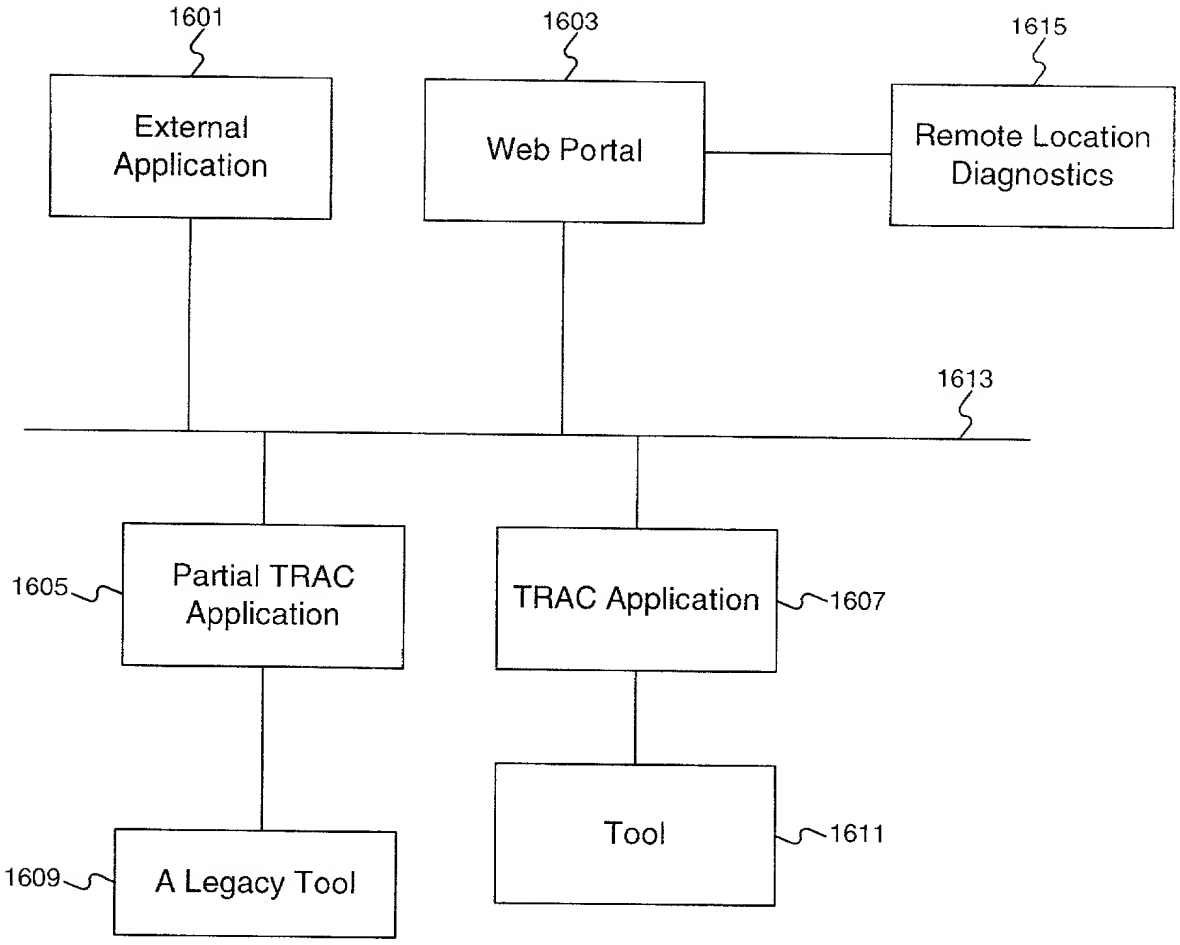

1601
External Application
1603
Web Portal
1615
Remote Location Diagnostics
1613
1605
Partial TRAC Application
TRAC Application
1607
1609
A Legacy Tool
Tool
1611

FIG. 16(a)

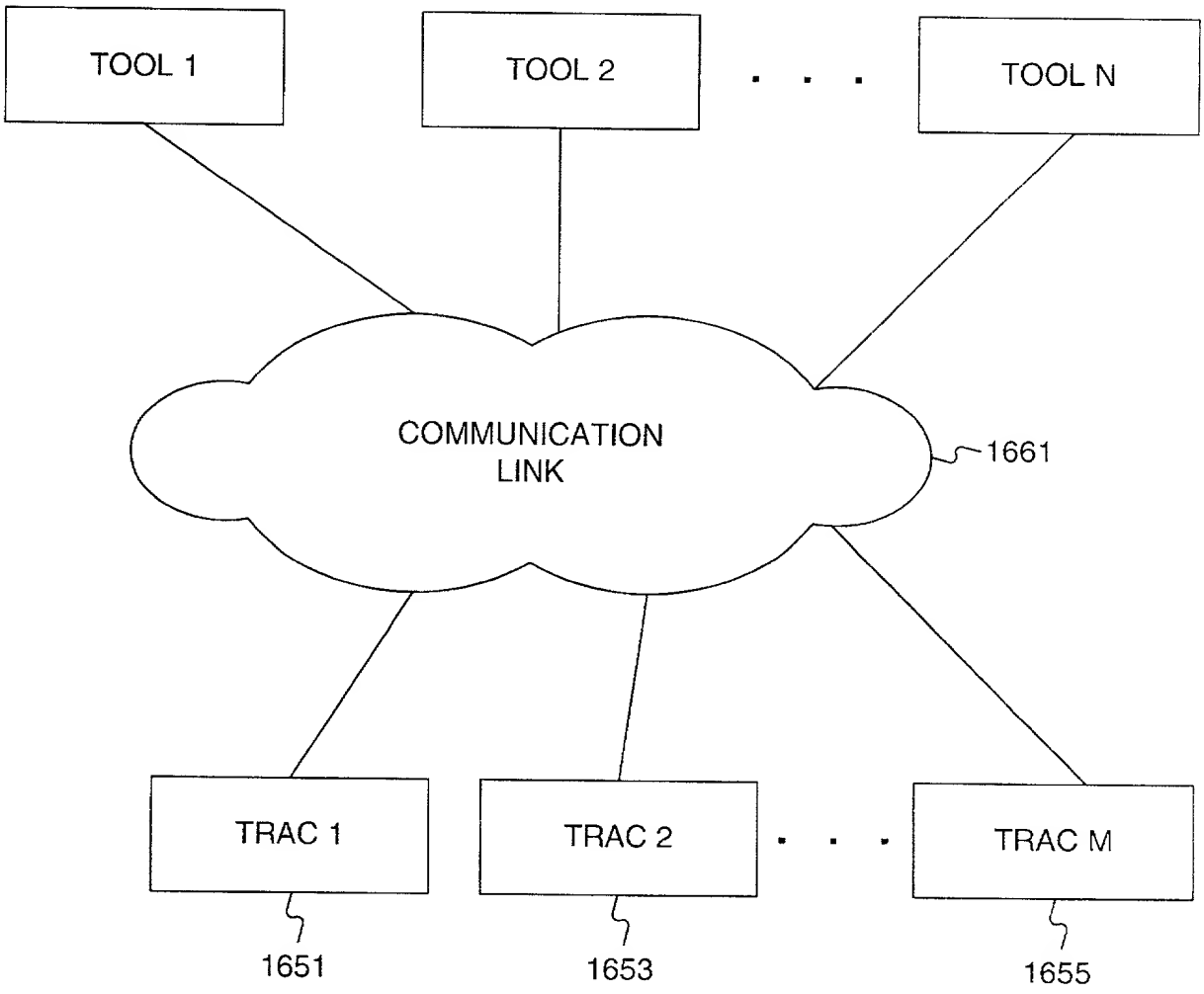

TOOL 1
TOOL 2
TOOL N
COMMUNICATION LINK
1661
TRAC 1
TRAC 2
TRAC M
1651
1653
1655

FIG. 16(b)

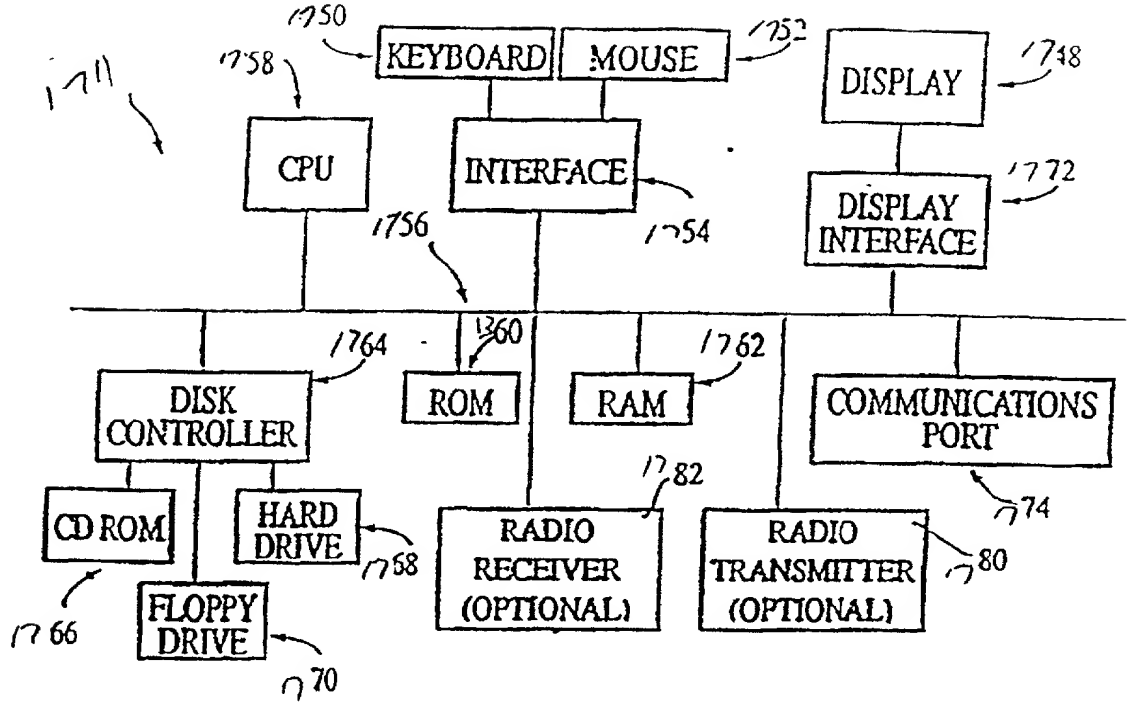

1750
KEYBOARD
MOUSE
1752
DISPLAY
1748
1758
1711
CPU
INTERFACE
1754
DISPLAY INTERFACE
1772
1756
1764
1760
1762
DISK CONTROLLER
ROM
RAM
COMMUNICATIONS PORT
1782
1774
CD ROM
HARD DRIVE
1768
RADIO RECEIVER (OPTIONAL)
RADIO TRANSMITTER (OPTIONAL)
1780
1766
FLOPPY DRIVE
1770

FIG. 17

3,952,744 - 06-Feb-90

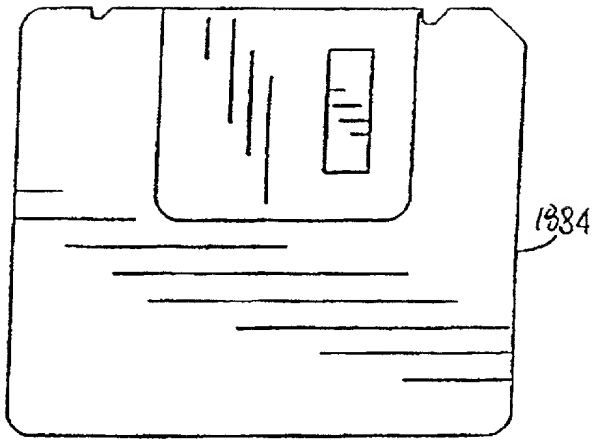


FIG. 18